

Pesticide Safety *Information*

Worker Health and Safety Branch

Series A

A-3 ENGINEERING CONTROLS IN AGRICULTURAL SETTINGS (Closed Systems, Enclosed Cabs, Water Soluble Packaging)

General Information:

Engineering controls are methods used to reduce exposure (closed system, enclosed cab, etc.) other than personal protective equipment (respirators, gloves, etc.). Hand-pouring highly toxic pesticides is a very hazardous activity, and has resulted in many serious human illnesses and injuries. In addition, application of very toxic pesticides by unprotected persons has also resulted in many pesticide-related illnesses and injuries. Proper use of engineering controls, such as closed systems, enclosed cabs and water soluble packaging, reduces the potential for human exposure. On the other hand, improper use, cleaning or maintenance of these systems, can also lead to excess exposure. In many instances, substitution of the personal protective equipment (PPE) required by the pesticide label and California regulations is allowed when properly using engineering controls (see Table 1).

Closed Systems:

California pesticide worker safety regulations require closed system use when:

- employees handle liquid pesticides or liquid mixes or dilutions of pesticides displaying the signal word "DANGER" on the label
- employees handle any minimal exposure pesticide.

The closed system requirement applies to all employees who use these pesticides for the production of an agricultural crop. There is an exemption that allows employees to handle up to 1 gallon of product per day in original containers of up to 1 gallon in size without using a closed system.

A "closed system" is a procedure for removing a pesticide from its original container, rinsing the emptied container, and transferring the pesticide and

rinse solution through connecting hoses, pipes and couplings that are sufficiently tight to prevent exposure of any person to the pesticide or rinse solution. No rinsing is required when the pesticide is used without dilution or the container is a returnable or reusable container that will be sent back to the registrant. A closed transfer system for the dilute mixture is required if the pesticide label displays word "Danger".

If you use a closed system, you must receive training in the use of the closed system and safety precautions necessary during use.

You must wear PPE as required by the label or California regulations. Some substitutions for label-required PPE are allowed when using a closed system (Table 1). All PPE required by the pesticide label must be present at the work site for emergency use. Eye protection and gloves are still required in some instances while using a closed system (see Table 1 for exemptions).

California's Closed System Criteria. To meet California's requirements, a closed system must:

- remove the pesticide from the original container
- rinse the container
- transfer the pesticide to the mix tank
- be made of materials appropriate for use with pesticides and a pressurized system
- have gauges protected against breakage
- adequately measure the pesticide used
- have shut-off valves to prevent chemical from spilling when the hose is disconnected.

Do not remove the probe from the container unless the container is empty and rinsed, the pesticide was

used undiluted and the container is empty, or the probe has been approved for removal from partially empty containers. For more details on closed system criteria, contact the California Environmental Protection Agency, Department of Pesticide Regulation (DPR). You may obtain a list of closed systems, which have been evaluated and found to meet these criteria, from DPR ((916) 445-3920).

The system must be cleaned and maintained according to the manufacturer's instructions. If the system is not a commercially produced system, it must be maintained on a regular basis. A record of cleaning and maintenance must be kept.

Water Soluble Packaging:

Use of pesticides in water soluble packaging (WSP) is considered equivalent to mixing with a closed system. However, dilutions of pesticides in WSP with the signal word "Danger" on the label must be transferred (i.e., from a mix tank to the application vehicle tank) via a closed system. DO NOT cut open WSP to use a partial package. This invalidates the closed system equivalency and puts the mixer at a high risk of overexposure.

Enclosed Cabs:

Proper use of enclosed cabs can reduce exposure to applicators, pilots and flaggers. An enclosed cab is a chemical resistant barrier that completely surrounds the occupant of the cab and prevents contact with pesticides or treated surfaces outside the cab. Enclosed cabs can include a crop duster cockpit, a closed cab on a tractor, or a truck or car with the windows and doors closed. There are two types of enclosed cabs:

- Cabs with only the physical barriers (doors, windows, etc.) to prevent exposure
- Enclosed cabs acceptable for respiratory protection. This cab incorporates a dust/mist filtering and/or vapor/gas purification system, in addition to the physical barrier. These cabs must meet certain criteria and be approved by the director of the DPR.

This leaflet assists readers in understanding pesticide regulations. It is not a legal document. The legal reference is found in the California Code of Regulations, Title 3. The words "must" and "should" used in the text are not the same. The word "must" means the action is required and comes from California regulations. The word "should" means additional handling practices that are recommended to further reduce exposure.

Table 1: Allowed Substitutions when Using Engineering Controls

When using the following:	Handlers may substitute:*	For the following:
Closed system for pesticides with "Danger" or "Warning"	Coveralls, chemical resistant gloves and chemical resistant apron	PPE required on the pesticide labeling
Closed system for pesticides with "Caution"	Work clothing	PPE required on the pesticide labeling
Closed system under positive pressure	Protective eyewear**	
Mixing pesticides in water soluble packets	Use in water soluble packets***	Use of a closed mixing system
Enclosed cab	Work clothing and respiratory protection required	PPE required on the pesticide labeling
Enclosed cab acceptable for respiratory protection	Work clothing	PPE required on the pesticide labeling
Any pesticide	Chemical resistant suit	Coveralls and a chemical resistant apron

* For any substitution, all PPE required by the label must be available in case of an emergency

** Protective eyewear is required in addition to coveralls, chemical resistant gloves and apron for pesticides with "Danger" or "Warning" or in addition to work clothing for pesticides with "Caution" on the label

*** Using pesticides in water soluble packets is equivalent to mixing with a closed system. However, transfer from mix tank to application tank must be made with closed transfer equipment.